

# MATERIAL SAFETY DATA SHEET

National Institute of Standards and Technology  
Standard Reference Materials Program  
100 Bureau Drive, Stop 2320

Gaithersburg, Maryland 20899-2320

MSDS Coordinator: Mario Cellarosi  
Telephone: 301-975-6776  
FAX: 301-926-4751  
E-mail: SRMMSDS@nist.gov

SRM Number: 3012  
MSDS Number: 3012  
SRM Name: 1,2-Dichloroethane  
in Methanol

Date of Issue: 12 January 2006

Emergency Telephone ChemTrec:  
1-800-424-9300 (North America)  
+1-703-527-3887 (International)

## SECTION I. MATERIAL IDENTIFICATION

**Material Name:** 1,2-Dichloroethane in Methanol

**Description:** SRM 3012 consists of two 5-milliliter sealed borosilicate glass ampoules, each containing approximately 2.5 mL of a solution of 1,2-dichloroethane in methanol.

**Other Designations:** 1,2-Dichloroethane (1,2-ethylene dichloride; ethylene chloride; 1,2-bichloroethane; alpha, beta-dichloroethane; sym-dichloroethane; glycol dichloride; ethylene dichloride) in **Methanol** (methyl alcohol; wood alcohol; methyl hydroxide; carbinol; monohydroxymethane; wood spirit; wood naphtha; methylol)

Name	Chemical Formula	CAS Registry Number
Methanol	CH <sub>3</sub> OH	67-56-1
1,2-Dichloroethane	C <sub>2</sub> H <sub>4</sub> Cl <sub>2</sub>	107-06-2

**DOT Classification:** Methanol; UN1230; Packing Group II; Hazard Class 3.

## SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Methanol	99	OSHA TWA: 260 mg/m <sup>3</sup> (200 ppm)
		NIOSH recommended TWA (skin): 260 mg/m <sup>3</sup> (200 ppm) (10 h)
		NIOSH recommended STEL (skin): 325 mg/m <sup>3</sup> (250 ppm)
		UK WEL TWA (skin): 266 mg/m <sup>3</sup> (200 ppm)
		UK WEL STEL (skin): 333 mg/m <sup>3</sup> (250 ppm)
		Human, Inhalation TC <sub>LO</sub> : 86 000 mg/m <sup>3</sup>
		Human, Oral LD <sub>LO</sub> : 143 mg/kg
1,2-Dichloroethane	1	Man, Oral TD <sub>LO</sub> : 3 429 mg/kg
		OSHA TWA: 50 ppm
		OSHA ceiling: 100 ppm
		OSHA peak: 200 ppm (5 min in any 3 h)
		ACGIH TWA: 10 ppm
		NIOSH recommended TWA: 4 mg/m <sup>3</sup> (1 ppm) (10 h)
		UK WEL TWA (skin): 21 mg/m <sup>3</sup> (5 ppm)
		Human, Oral LD <sub>LO</sub> : 286 mg/kg
		Human, Oral TD <sub>LO</sub> : 428 mg/kg
		Human, Inhalation TC <sub>LO</sub> : 6 mg/m <sup>3</sup> (15 min)

**Carcinogenic, Tumorigenic, Mutagenic Reproductive Data:** 1,2-Dichloroethane has been investigated as a carcinogenic, tumorigenic, reproductive, and mutagenic effector. Methanol has been investigated as a mutagenic and reproductive effector.

---

**SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS**

---

<b>Methanol</b>	<b>1,2-Dichloroethane</b>
<b>Appearance and Odor:</b> a clear, colorless liquid with a characteristic alcoholic odor	<b>Appearance and Odor:</b> a clear, colorless liquid with a sweet odor
<b>Relative Molecular Mass:</b> 32.04	<b>Relative Molecular Mass:</b> 98.96
<b>Density:</b> 0.7914 g/m <sup>3</sup>	<b>Density:</b> 1.2351 g/m <sup>3</sup>
<b>Boiling Point:</b> 65 °C (149 °F)	<b>Boiling Point:</b> 84 °C (183 °F)
<b>Freezing Point:</b> -94 °C (-137 °F)	<b>Freezing Point:</b> -35 °C (-31 °F)
<b>Vapor Pressure (@ 20 °C):</b> 97.25 mmHg	<b>Vapor Pressure (@ 25 °C):</b> 87 mmHg
<b>Evaporation Rate (butyl acetate = 1):</b> 4.6	<b>Evaporation Rate (butyl acetate = 1):</b> 6.4
<b>Viscosity (@ 20 °C):</b> 0.59 cP	<b>Viscosity (@ 21 °C):</b> 0.84 cP
<b>Solubility in Water:</b> soluble	<b>Solubility in Water (@ 20 °C):</b> 0.87 %
<b>Solvent Solubility:</b> soluble in ether, benzene, alcohol, acetone, chloroform, ethanol, ketones, and most organic solvents	<b>Solvent Solubility:</b> soluble in alcohol, ether, acetone, benzene, fats, resins, rubbers, chloroform, carbon tetrachloride, and organic solvents

**NOTE:** The physical and chemical data provided are for the pure components. Physical and chemical data for this methanol/1,2-dichloroethane solution do not exist. The actual behavior of the solution may differ from the individual components.

---

**SECTION IV. FIRE AND EXPLOSION HAZARD DATA**

---

**Methanol****Flash Point:** 11 °C**Method Used:** Closed Cup**Autoignition Temperature:** 385 °C**Flammability Limits in Air (Volume %):****UPPER:** 36**LOWER:** 6.0**1,2-Dichloroethane****Flash Point:** 13 °C**Method Used:** Closed Cup**Autoignition Temperature:** 413 °C**Flammability Limits in Air (Volume %):****UPPER:** 16**LOWER:** 6.2

**Unusual Fire and Explosion Hazards:** Methanol and 1,2-dichloroethane are severe fire hazards. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Vapor and air mixtures are explosive.

**Extinguishing Media:** Use alcohol-resistant foam, regular dry chemical, carbon dioxide, or water spray.

**Special Fire Procedures:** Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

---

**SECTION V. REACTIVITY DATA**

---

**Stability:**   X   Stable        Unstable

Stable at normal temperatures and pressure.

**Conditions to Avoid:** Avoid contact with heat, sparks, flames, or other sources of ignition. Avoid inhalation of vapors or combustion by-products.

**Incompatibility (Materials to Avoid):** This material is incompatible with halo carbons, combustible materials, metals, oxidizing materials, halogens, metal carbide, amines, acids, and bases.

See Section IV: "Unusual Fire and Explosion Hazards".

**Hazardous Decomposition or Byproducts:** Thermal decomposition products may include toxic oxides of carbon, hydrogen chloride, vinyl chloride, and various organic fragments.

**Hazardous Polymerization:**        Will Occur   X   Will Not Occur

---

**SECTION VI. HEALTH HAZARD DATA**

---

**Route of Entry:**   X   Inhalation   X   Skin   X   Ingestion

**Methanol:** Methanol is a skin and eye irritant and can cause nerve damage. This material is harmful if inhaled or absorbed through skin. Ingestion may be fatal or cause blindness. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Exposure can cause damage to the eyes, liver, heart, and kidneys. Methanol may also cause gastrointestinal disturbances and convulsions.

**1,2-Dichloroethane:** 1,2-Dichloroethane may be harmful by inhalation, ingestion, or skin contact. Eye contact of high vapor concentrations of 1,2-dichloroethane or to the liquid may cause discomfort, lacrimation, and temporary corneal injury. Repeated or prolonged contact may cause conjunctivitis. Direct contact to skin may cause irritation. Prolonged contact may result in severe irritation, moderate edema, and necrosis. 1,2-Dichloroethane may be absorbed through the skin and cause systemic toxicity as detailed in acute inhalation. Repeated or prolonged skin contact may produce dermatitis. Acute inhalation may cause irritation of the upper respiratory mucous membranes and central nervous system effects which include lightheadedness, trembling, anxiety, drowsiness, partial paralysis, collapse, and coma. Death may occur from respiratory or cardiac arrest. Chronic exposure by inhalation to 10 ppm to 37 ppm may cause nausea, vomiting, dizziness, and adverse nervous system and liver effects. Ingestion of 1,2-dichloroethane may cause a burning sensation in the mouth, throat, and stomach. Systemic toxicity, including central nervous system depression may occur as described in acute inhalation exposure.

**Medical Conditions Generally Aggravated by Exposure:** **1,2-Dichloroethane** exposure may aggravate heart or cardiovascular disorders, heart problems, kidney disorders, liver disorders, and respiratory disorders. **Methanol** may cause eye disorders, kidney disorders, skin disorders, and allergies.

**Target Organ(s) of Attack:** Central nervous system (CNS). Liver. Kidneys.

**Listed as a Carcinogen/Potential Carcinogen (Methanol):**

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	<u>      </u>	<u>  X  </u>
In the International Agency for Research on Cancer (IARC) Monographs	<u>      </u>	<u>  X  </u>
By the Occupational Safety and Health Administration (OSHA)	<u>      </u>	<u>  X  </u>

**Listed as a Carcinogen/Potential Carcinogen (1,2-Dichloroethane):**

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	<u>  X  </u>	<u>      </u>
In the International Agency for Research on Cancer (IARC) Monographs	<u>  X  </u>	<u>      </u>
By the Occupational Safety and Health Administration (OSHA)	<u>      </u>	<u>  X  </u>

## EMERGENCY AND FIRST AID PROCEDURES:

**Skin Contact:** Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

**Eye Contact:** Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

**Inhalation:** If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration by qualified personnel. Obtain medical assistance if necessary.

**Ingestion:** If ingested, obtain medical assistance immediately.

---

## SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

---

**Steps to be Taken in Case Material Is Released or Spilled:** DO NOT touch spilled material. Reduce vapors with water spray. Avoid heat, flames, sparks, and other sources of ignition. Stop the leak if one can do so without risk. Absorb small spills with sand or other non-combustible absorbent material and place into containers for proper disposal. Keep out of water supplies and sewers. 1,2-Dichloroethane is subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).

**Waste Disposal:** Follow all federal, state, and local laws governing disposal. Methanol is subject to disposal regulations U.S. EPA 40 CFR 262, Hazardous Waste Number U154. 1,2-Dichloroethane is subject to disposal regulations U.S. EPA 40 CFR 262, Hazardous Waste Number D028 and U077; dispose in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the regulatory level of 0.5 mg/L.

**Handling and Storage:** Store and handle in accordance with all current regulations of standards. Keep methanol and 1,2-dichloroethane separated from incompatible substances. Persons handling this material must wear protective eyewear, clothing, and gloves to prevent contact with this material. Methanol and 1,2-dichloroethane are subject to storage regulations: U.S. OSHA 29 CFR 1910.106.

Sealed ampoules of SRM 3012 should be stored in the dark at temperatures between 10 °C and 30 °C. Protect containers from physical damage.

---

## SECTION VIII. SOURCE DATA/OTHER COMMENTS

---

**Sources:** MDL Information Systems, Inc., MSDS *Ethylene Dichloride*, 16 June 2005.  
MDL Information Systems, Inc., MSDS *Methyl Alcohol*, 16 June 2005.

**Disclaimer:** Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data on the MSDS. The certified value for this material is given in the NIST Certificate of Analysis.